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| **Lesson Title** | **Using Order of Operations to Evaluate and/or Simplify Expressions** |
| **Subject area/grade level** | **Mathematics Grades 4** |
| **Introduction** | The students will work on understanding the importance of order of operations and applying them to basic algebraic problems. |
| **Lesson Length** | 75 minutes |
| **Materials** | 2 sets of each (3 different colored papers) Real Life Task Cards  1-2-3 Order Me Please, Out of Order, and Make the Number worksheets (1 per student)  Student Math Journals  Laptops & ELMO  TI-15 calculator |
| **Lesson Overview** | The lesson applies/extends the order of operations with practice in a game context. The students will continue to explore the importance of order of operations. |
| **Tennessee Standards**  **MCS Power Standards** | **TN GRADE 4**  SPI 0406.1.1 Verify a conclusion using the commutative, associative and distributive properties  SPI 0406.2.9 Solve multi-step problems of various types using whole numbers, fractions, and/or decimals.  GLE 0406.2.6 Solve problems involving whole numbers, fractions, and/or decimals using all four arithmetic operations |
| **Lesson objective(s)** | The Learner will   * correctly verbalize order of operations * apply order of operations when simplifying/evaluating expressions * use correct notation to write a numerical expression * substitute a value for a variable in an expression using grouping symbols appropriately to retain order of operations * use technology with appropriate notation to evaluate expressions |
| **ENGAGEMENT**   * Describe how the teacher will capture students’ interest. * What kind of questions should the students ask themselves after the engagement? | Have the students write in their journal what they already know about Order of Operations   |  |  |  | | --- | --- | --- | | Ask students to arrange index cards, each of which contains one step of an everyday process for which order of steps is unique. | | | | Grocery Shopping | Build a house | Wrap a gift | | Drive to store  Park car in store parking lot  Exit car  Walk to store entrance  Get a cart to roll thru store  Fill cart with groceries  Roll cart to check out  Place cart items on counter  Pay for groceries  Put bags back into cart  Exit store  Walk cart to car  Put groceries in car  Get in car to go home | Get materials  Make foundation  Build floor  Make frame for walls  Add roof  Add windows and doors  Add electrical lines/water pipes  Insulate walls  Cover wall studs with drywall  Paint walls | Secure item for gift  Remove price tag  Place item in box  Cut paper to fit box size  Wrap paper around box  Fold paper to box shape  Tape folds of paper in place  Wrap ribbon around box  Tie ribbon in bow  Add card to top of box |   When does order of actions matter in math?  What kind of math problem has multiple steps?  How and when do we write action (operation) steps for computations?  Explain that we have need for these same types of communication and understanding in mathematics, i.e. there is an order to operations so that everyone gets the same value when evaluating a numerical statement.  **Show the Powerpoint and video/song on Order of Operation –** [**http://www.schooltube.com/video/6eb807e5620d49bd5687/the-order-of-operations-songrap-to-the-tune-of-umbrella**](http://www.schooltube.com/video/6eb807e5620d49bd5687/the-order-of-operations-songrap-to-the-tune-of-umbrella) **(song)**  **Or try this website for another song** <http://sciencepoems.net/video/pemdasmovie.aspx> - song on PEMDAS |
| **EXPLORATION** | The students will begin by working in small groups to do the 1-2-3- Order Me Please worksheet (they can use calculators)  They will then work on the Out of Order worksheet with their same groups.  The students are allowed to use their calculators during this time. |
| **EXPLANATION** | We will then get back together as a whole to go over some of the problems from these 2 worksheets. The teacher will use the ELMO so the students can see how to work it out.  We will address problems the students had the most difficulty with. |
| **ELABORATION INVOLVING TECHNOLOGY** | The students will continue practicing this skill on their own through the website/game [www.funbrain.com/algebra/index.html](http://www.funbrain.com/algebra/index.html) (Order of Operation). The teacher will be able to monitor and determine if the student needs more help or needs to be challenged. This game allows for low, medium, and high range of difficulty. |
| **EVALUATION** | The students will go back to their math journals and write what they learned today dealing with Order of Operations and what they need more help with. They will also do the Order of Operations Exit Quiz. For homework the students will complete the worksheet Make the Number. |

<http://www.dadsworksheets.com/v1/Worksheets/Order%20of%20Operations.html> great website with printable worksheets for order of operations (easy to hard)

Pemdas Short Poem

[Parentheses, Exponents, Multiplication, Division, Addition Subtraction]

Multiplication,

Parentheses,

Add, subtract,

Division please…

What comes first?

What comes last?

PEMDAS rules, come help fast!

Pemdas Limericks

[Parentheses, Exponents, Multiplication, Division, Addition Subtraction]

 PEMDAS, the ruler of order, To be followed both sides of the border, Skip it you’ll see, You can’t solve properly, And the grades you receive will be shorter…    Said math teacher, Misses Quite-Mean, Why are you sure? It’s not 144? She pulled out her PEMDAS machine…    Products before difference- I’ll die! Without PEMDAS right here by my side, Now that I know, The way of math flow, I figure my problems with pride….   Parentheses, exponents first, Multiplication is next, but not worse, Division I say,  The next one to play, Add, subtract... Don't do the reverse!

PEMDAS

PEMDAS!!!

Yelled teacher,

Voice loud like chimes,

Know what comes first,

Subtraction or times...

Or division, or adding, or any old math,

If you can't learn your PEMDAS,

You can't pass my class!!!

The name of the teacher was Mary McGrath,

And getting math wrong,

Incurred all her wrath!

And PEMDAS she said,

Makes you so right,

When you've seen PEMDAS,

You've seen the light...

Let's learn it again,

The order of math,

PEMDAS, so fine,

Like pockets of cash!!!

Parenthesis first,

Subtracting is last...

Multiplication, Division,

The vote has been cast...

E for exponents,

You already know,

Let us say, [](http://mathstory.com/Poems/poem%20images/pemdas/xsquared.gif)

Makes numbers grow...

M, multiplies,

Before you go add,

D's for division,

Not Dave, Dog or Dad...

The A's for addition,

And addition's no fad,

S for subtraction,

Who's last but still rad...

Part II

That same afternoon, In our math class, Something bad happened,  With Mary McGrath... An innocent boy, Joey Zach Zemjas, Discovered what happens,  When you forget PEMDAS... Now I can say, McGrath is real mean, Resident evil, Mean-teacher-queen!!! But back to my story, And Joey's big blunder, At least he's alive, And that's a true wonder... McGrath made a problem, For us, to be solved, But Joe didn't care, He wasn't involved... The problem she'd written, 4 X 3 - 2... Wasn't so hard,  If you just thought it through... But Joey had trouble, He made a mistake, His PEMDAS was raw,  Like the batter of cake... Joey said, 3-2 is 1, And 4 X 1 is 4, Four's the answer,  I'm satisfied, and feeling pretty sure... McGrath grabbed Joey's little hand, And yanked him from his seat, You ignored the rule of PEMDAS, It's time for your defeat!!! PEMDAS-SCHMEMDAS-GEMDAS-GOO! Yelled Joey to the class, McGrath turned red,  McGrath turned blue, This day will be your last!!! She twisted Joey's left arm, Back behind his head, Probably should have hurt a lot,  But Joey laughed instead... Then she bent him silly, Glued him to the wall,  Used a pound of super-glue,  So sure he'd never fall... Parts of Joe she mushed up, And twisted him to spell, PEMDAS, PEMDAS, PEMDAS  She felt so very swell... Joe hung all of last year, Until the end of school, And when McGrath, Took him down, Joey knew the rule... I hope you all have listened, I hope you've all tuned in, I hope you know your, PEMDAS It's the only way to win...

4 X 3 - 2...

is equal to 12 - 2 which is 10...

Multiplication comes before subtraction...